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BOVINE MASTITIS WITH PARTICULAR REGARD TO ERADICATION OF *STREPTOCOCCUS AGALACTIAE* *†

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Despite modern advances in treatment, mastitis remains a disease of major importance. On most farms the obvious cases are treated and a great deal of good is done thereby, but unless more is done there remains a large number of infected animals which are giving less milk than they should, which are a persistent source of infection to other animals and in many of which serious damage will be sustained before they come to treatment. Taking England and Wales in general, the greater part of these infections is with *Str. agalactiae*.

INCIDENCE

In Surrey, examination of 48 herds in 1947 showed that 24·8 per cent. of cows were infected with *Str. agalactiae*, 5·3 per cent. with *Str. dysgalactiae*, 4·7 per cent. with *Str. uberis*, and 8 per cent. with haemolytic staphylococci. One-third of all the streptococcus infections were associated with some abnormality of milk on the day of examination, whereas between one-fifth and one-sixth of the staphylococcus infected cows showed similar changes. *Str. agalactiae* was therefore responsible for about twice as much abnormality as all the others put together.

In many other areas of Great Britain, it is known that *Str. agalactiae* plays a similarly predominant part, though in some there are figures showing that it is less common and, in some, staphylococcus infection appears to be more frequent.

The absolute incidence of *Str. agalactiae* in Great Britain is not known, the figures that have been published in the past having been obtained in the main from groups of herds in which mastitis was the source of trouble. One of my colleagues at Weybridge, however, recently has made a random survey of two counties in the South of England and found that over 60 per cent. of herds were infected and about 15 per cent. of cows. A random examination of a considerable number of herds in Cheshire in the course of another experiment in 1948, also indicated a somewhat similar percentage of infected herds and cows. The incidence in these herds, 15 per cent., is considerably lower than that reported in the past. Two reasons are concerned in this; firstly, as already said, previous figures were in general obtained from herds in which mastitis was a problem; secondly, the widespread use of modern methods of treatment, and particularly of penicillin in recent years, has probably reduced the over-all infection. To-day, I intend to deal mainly with our own work at Weybridge with regard to the course, epidemiology, diagnosis and therapy of the disease in milking cows and to the eradication of *Str. agalactiae*. I shall say little about hygiene and such factors as milking procedure though both are of great importance.

Str. agalactiae MASTITIS

The first symptoms of *Str. agalactiae* mastitis are usually small clots in the fore-milk. It is seldom that symptoms of acute inflammation with pain and tenderness are present, and in some animals little may be seen. Development may be slow but usually clots soon appear and increase in amount and there is a gradual induration of the quarter until function is lost. Some improvement may occur with the flow of milk at a new calving, but clots usually recur and the disease progresses. During all this time the animal is infective to others and giving less milk than she should.

The common method of transmission is undoubtedly from udder to udder during milking. *Str. agalactiae* has never been obtained from a site other than milk or a place easily contaminated by infected milk and the only methods by which it has been transmitted under practical conditions are by milking with contaminated hands, application of infected milk to the teat orifice or actual injection through the teat canal. It has also been shown in recent years by workers at various laboratories in Great Britain that in an infected herd, *Str. agalactiae* can frequently be obtained from the teats and milkers' hands (before milking), that it can also often be obtained from the cows' skin, from floors and from various other places from which infection might be spread to cows, and that it can survive for long periods in these latter places. It is obvious, therefore, that infection could arise from sources of this kind, though the main method of infection is undoubtedly from cow to cow at milking. The human throat may also become infected with similar streptococci and infection could arise from this source. Infection can be set up experimentally fairly easily by milking with hands contaminated with infected milk or by injection into the udder but there is a distinct difference in the ease with which different cows can be infected. Experiments using these methods in three successive years have shown us that, in general, the ease with which animals can be infected increases with age, but that there are some individuals which resist or succumb to infection irrespective of age and that those which have become infected in one experiment and been cured are more easily reinfected than those which have resisted previous attempts to infect them. This could be because one infection sensitises to a future one, but it seems more likely that there is an inherent difference in the susceptibility of different animals and this might be of genetic origin. In these experiments, cows were exposed to infection and when the necessary data had been obtained, were treated with penicillin, tested for a sufficient period to ensure that they were not infected and then used for a further experiment.

* It is a pleasure to express my indebtedness to my colleagues at Weybridge: G. Slavin, E. C. Hulse, J. E. Lancaster, P. Stuart, C. D. Wilson, A. Chodkowski and J. Zweig, all of whom have worked on some aspect of the work on which this paper is based.

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Diagnosis

Clinical cases need no special method of diagnosis. For adequate control, however, other methods are necessary and for this purpose cultural methods are the only ones that can be recommended. Methods for this purpose have included those in which milk is sown directly on to culture plates and those in which it is first enriched by incubating the milk sample over night, followed by microscopic or cultural examination or in which it is sown into special media. We prefer the direct method and my colleagues have recently developed a method in which samples are taken, usually by the farmer, on to jars of special medium, which is put in the incubator and examined two days later. This has made it possible to deal with large numbers of samples cheaply and quickly.

The so-called indirect tests, that is to say, those in which milk is examined for small clots, for catalase or chloride content, or for *p*H reaction, are positive in a variable and, in some cases, high percentage of infected animals: but they do not detect infections early enough or distinguish between the different infections and may be positive in uninfected cows at the beginning or end of lactation.

It is intended that facilities for cultural examination of large numbers of herds will be available at V.I.O. Centres in the near future.

Treatment

A large number of methods of treatment have been tried in recent years. The acridine dyes have fallen into dis-use, because, although efficient, they discolour the milk and cause a definite, if temporary, drop in yield and are, in some cases, followed by more serious effects. Tyrothricin, gramicidin and Novoxil have also ceased to be used because, though efficient, they are irritating to the udder tissue. Sulphonamide in oil was used for a time and was efficient but it was not entirely free from irritating effects and has now been replaced by penicillin. Diamino-diphenyl sulphone has also been considerably used and is efficient. It often, however, causes some udder disturbance in milking cows and has therefore found its greatest use in dry cows in which it persists well and produces a high rate of sterilisation. Sulphanilamide by the mouth has been used widely and leads to removal of the clinical symptoms in about 60 per cent. of the cases. It, however, does not sterilise more than 25 per cent. of infections and recurrences are common. There is little published information regarding the more active sulphonamides by mouth and they are in any case costly. In the U.S.A. sulphamezathine, with or without penicillin, has been used and good results reported, but published data are few. Penicillin is now the method of choice, because it is free from irritating effects and there is no evidence that resistant strains develop in the udder. Two doses of 20,000 units, after successive afternoon milkings, provide about 90 per cent. of *clinical* cures and sterilise about 70 per cent. of the infections. Prolonged treatment, *e.g.*, injections of 20,000 to 100,000 units after five successive afternoon milkings, sterilises about 90 per cent. of infection. The injection of three doses of 100,000 units at intervals of 48 hours has given similar results, whilst results with procaine penicillin are, so far, at least as good, though definite conclusions must wait until more herds have been treated. No single dose method of equal efficiency has yet been found.

Other Forms of Mastitis in Milking Cows

Str. dysgalactiae, *Str. uberis*, *Str. zooepidemicus* and the haemolytic staphylococci differ from *Str. agalactiae* in that they have at times been obtained from other sites in the cow, such as the tonsils, uterus and vagina, whilst haemolytic staphylococci are commonly present on the skin. There are also differences in the course of these infections. Whilst *Str. agalactiae*, when once established, usually persists, *Str. dysgalactiae*, *Str. uberis* and the haemolytic staphylococci are commonly found at one examination and not the next, even if the interval is short, whilst a cow which has once shown infection may never again show infection or, at any rate, not within such a period as would suggest that infection had persisted since the original examination. Attempts to eradicate such infections by treatment or segregation are obviously going to be difficult. It seems that these infections are generally overcome by the cow without symptoms, or with only minor disturbance. Some of the streptococcus infections are acute, especially those with *Str. dysgalactiae* and *Str. zooepidemicus*, and in these the result may be quick loss of a quarter or complete recovery in one to a few days or sometimes a chronic infection. Some infections with *Str. dysgalactiae* or *Str. zooepidemicus* and a larger number of those with *Str. uberis*, however, never show acute symptoms and are clinically indistinguishable from *Str. agalactiae*.

The staphylococcus infections vary. In most herds they are sporadic and cause little trouble, in others a considerable number of cows may carry infection and if these are heavy severe trouble may result. An acute mastitis may occur soon after calving and may progress to the well known gangrenous stage. For some reason or other, this gangrenous stage appears now to be much less common than formerly. Some of the chronic staphylococcus infections are marked by considerable induration of the teat canal, or wall of the sinuses; many are indistinguishable from *Str. agalactiae* infection clinically.

The treatment of all these infections is more difficult than that of *Str. agalactiae*. A trial carried out in the early days of penicillin, with the assistance of practitioners, showed that whilst penicillin was markedly superior to earlier methods of treatment for *Str. agalactiae*, this superiority was not evinced in the case of these other infections. I will say no more about the treatment of clinical mastitis because it is a subject on which practitioners have more experience than we have and one on which I hope to gain a great deal of information from you this afternoon.

Summer Mastitis

Up to a few years ago, it was generally agreed that the cause of summer mastitis was *C. pyogenes*. In recent years, however, it has been found that other organisms, *viz.*, *Str. dysgalactiae*, the haemolytic staphylococci and even, occasionally, *Str. agalactiae* may also be concerned. This led to further study of the material from infected cows and we found that in addition to the above organisms, it is quite common to find an anaerobic streptococcus accompanying the above organisms and that it may even occur alone. There is also frequently present a small streptococcus, which is a symbiont on *Str. dysgalactiae*. I hope we shall have more information on this aspect at a later date.

We have also, in recent years, carried out three field trials, each involving 500 to nearly 1,000 cows, in order to test possible methods of prevention. It has not been easy to draw definite conclusions from these trials, because in each trial the incidence of summer mastitis has been low in the controls as well as the treated animals. We have, however, found no support for the view that toxoid or a formalised vaccine is a useful preventive. There are indications that the injection of penicillin, preferably every fortnight, during the dry stage may

be of value, but in view of the relatively low incidence of the disease in most areas in many years and the cost of such a procedure, nothing more should be said at this stage.

The small amount of work on treatment in which we have been associated with practitioners, supports other reports in showing that whilst there are certain agents, *e.g.*, sulphapyridine, penicillin and toxoid, which may save some cows' lives and possibly some quarters, there is yet no satisfactory method of treatment available. The main reason for lack of success in treatment appears to be that cases are usually so far advanced before they are seen that the drugs meet a mass of pus, which they cannot penetrate effectively and that the udder tissue is actually destroyed before treatment can be applied. I feel, therefore, we must place all our efforts on prevention, including study of the reasons why certain factors, such as non-lactation and climatic factors, obviously play such an important part.

Herd Control, Eradication of *Str. agalactiae* and Maintenance of Free Herds

In most herds, clinical cases are treated. This does a great deal of good because it is applied to the worst affected animals and reduces the amount of spread from them. On the average, however, about twice as many infected animals are left, from which infection will be spread to other animals.

Another method which has been used in this and other countries, is cultural examination of the milk of all animals and treatment of the infected. If treatment is made by a method which sterilises a high percentage of the infections and tests are continued to ensure this sterilisation and that other animals have not, meanwhile, become infected, this method may result in the eradication of infection, particularly if the number of infected animals is low. In our experience, however, where the infection rate is high, results have often been disappointing. The infection rate is usually brought to a low level but eradication may be delayed for a very long time, during which much further herd testing and treatment is necessary.

A third method which we have tested recently is the treatment of all cows in the herd, whether infected or not, and disinfection of the cows and premises. This mass treatment is not an economic one where the number of cows infected is small but is justified where the infection rate is high. We first attempted this method in our own experimental herd in which 13 out of 17 cows were infected and there was more than an average amount of clinical mastitis. The method used was to treat every quarter of every cow after five successive afternoon milkings with 100,000 units of penicillin. Penicillin cream was also used on the hands of the workers and teats of the cows for 14 days from the date of commencing treatment. The cows were disinfected with hypochlorite solution on the morning of the fifth day and then turned out whilst their premises were finally cleansed and treated with an approved cresol solution. The final treatment was applied at the afternoon milking of the same day, when clean milkers' clothes, udder cloths, etc., were provided. In the previous week, *Str. agalactiae* was present in 23 quarters and could be obtained from the teats of most cows (before milking), from various parts of the body in many, and from a number of other places in the environment of the cow. Tests every two days in subsequent weeks, showed that *Str. agalactiae* could not be isolated, either from the cows or their environment. This method was next tried in ten farm herds and the results have already been published. The herds contained 424 cows, of which 35 per cent. were infected with *Str. agalactiae*, 3 per cent. with *Str. dysgalactiae*, 5 per cent. with *Str. uberis* and 11 per cent. with haemolytic staphylococci. *Str. agalactiae* was eradicated from five herds at once, from another herd within three weeks by re-treatment of one cow, from another herd in six months by subsequent treatment of seven cows (two being heifers infected at their first calving), and from an eighth herd in 14 months by subsequent treatment of 14 cows. Two herds were reinfected and seven are now free. Work was stopped in one herd, because of lack of farm co-operation.

As will be expected from a knowledge of their presence in other sites in the cow, *Str. dysgalactiae*, *Str. uberis* and haemolytic staphylococci were not eradicated. They were, in most cases, reduced and with one or two exceptions, have never again reached pre-treatment levels, nor have they caused more trouble than previously. In one herd, the streptococcus infections, other than *Str. agalactiae*, caused a great deal of trouble before the herd was treated and this herd has continued to show mastitis due to these streptococci, though the amount has been less than earlier.

Clinical mastitis has, however, ceased to be a problem in all nine herds. A total of 51 cases, including those which showed only a few clots at a single milking and no loss of yield, occurred in the 304 cows in the nine herds over the period of two years following herd treatment, that is, one per year per eleven cows. This is not more than the number of cows with abnormal milk on the day of the pre-treatment samples. Only three quarters lost their function.

In the earlier treated herds, the penicillin was injected in distilled water. It was, however, during this trial that we first used penicillin in oil wax in single dose tubes and in the remainder of this trial and in subsequent work, which has always been done with similar tubes, we have found no evidence that the results are inferior to those with aqueous solutions. The main reason for the use of this method is, of course, the fact that the possibility of transmitting tubercle bacilli or other bacteria, is reduced to a minimum. It has also the advantages that the penicillin keeps well, is ready for immediate use and that concentrations maintained in milk appear to be more regular than with aqueous solutions.

Our next trial was one in which we made a comparison in groups of ten herds which were treated with five doses of 50,000 units penicillin, five doses of 20,000 units penicillin and three doses of 100,000 units penicillin, respectively, all at daily intervals after the afternoon milking, and in which we also included a group treated with 100,000 units of penicillin on five consecutive days but did not carry out disinfection. This trial is not yet finished from the eradication point of view, but it may be said that there appeared to be little difference between the immediate effectiveness of the above treatment, all of which gave between 85 and 95 per cent. success in removing *Str. agalactiae*. One-third of the herds were cleared at once with most of the methods and 70 per cent. of all herds are now clear.

We have not yet analysed the results in this second group of 40 herds as regards other infections and clinical mastitis, but it can be said quite unequivocally that, although rises and falls of one or other of these organisms have occurred, and rises have occasionally lasted for some weeks or months, the general level has not been higher than before treatment. Others have reported an increase of these other infections in some herds from which *Str. agalactiae* has been removed, but it has not been our experience. Similarly, the clinical result in all of the herds under treatment has been excellent and there are few with any mastitis problem left, whilst increases of milk yield are usual and quite often large. It is likely that some of this is due to other factors than mastitis

control and in some herds there are other factors concerned; but in the majority, the farmer himself takes the view that it is control of mastitis which has caused his increased yields and in most cases there is nothing else to which it can justifiably be ascribed.

In about 20 per cent. of the herds, we get some trouble with persistent occurrence of new infections. These can usually be ascribed to the owners' reluctance to get rid of a cow which has resisted several courses of treatment, to the presence of numerous teat lesions in the herd or to rank bad sanitary precautions, but in some cases we have no explanation to offer for failure to eradicate. One of our difficulties is that, having got rid of his obvious troubles, the owner is not particularly interested in the presence of a few infections in his cows and that it is therefore difficult to persuade him to take prompt and appropriate measures to prevent them.

We have now commenced a further large trial in Surrey, using as a basis the herds included in the random survey to which I referred at the beginning of this paper. We have tested over 300 herds in the last three months and with the co-operation of veterinary surgeons, are carrying out further tests on the value of three injections of calcium penicillin at intervals of 48 hours, two injections of procaine penicillin at intervals of 72 hours and a new single injection method. We also have a fourth group in which we are going to treat infected cows only, whatever the percentage in the herd. We are including this last group because, although previous experience has suggested that it is not the best method for heavily infected herds, it costs much less in the first place and we want to be quite sure, on a large group of herds, what its value is. We are also disinfecting some of the above herds and not others, in order to get a conclusive answer on this question.

We hope that some time next year we shall be able to present results from groups of 50 herds dealt with by each of the above methods and further data on the handling of infections other than *Str. agalactiae*.

Conclusions

There is no longer any doubt that *Str. agalactiae* mastitis can be adequately controlled and that eradication of this infection from large numbers of herds is practicable. Treatment of clinical cases alone will rarely achieve eradication. Treatment of all infected cows, on the basis of cultural tests, is likely to be successful if there are only a few infected animals but eradication is often long delayed if there are many. In such herds, mass treatment of all cows yields excellent results. One-third to one-half of the herds treated are cleared at once and others quickly. In some herds, difficulty is met and is due usually to a resistant infection in a cow which the owner will not remove, to infected teat lesions or absence of sanitary precautions. The other streptococcus infections and staphylococcus infections are in our experience, usually reduced and remain low, whilst clinical mastitis of all kinds reaches a low level, milk yields being correspondingly increased. This increase becomes most obvious in the lactation following treatment. Infections other than *Str. agalactiae* can, however, be a cause of serious loss in some herds and must become relatively more important as *Str. agalactiae* is brought under control. Further work is therefore needed on the chemotherapy of these infections and on the factors which favour their occurrence and their development. Proper sanitary precautions and good milking methods remain essential to assist in the control of these infections and the disease they produce.

Contributions in Opening Discussion

Mr. J. Berger: In congratulating Dr. Stableforth on his excellent paper, may I say that it is exactly what we wanted, in that it deals very largely with the problem of eradication of *Streptococcus agalactiae* infection and does not attempt to draw us too deeply into the whole complex problem of mastitis. At one time I was of the opinion that it was wrong to attempt to split the mastitis picture into any series of "water-tight compartments," but experience has proved that as far as *Streptococcus agalactiae* is concerned this may be treated as a separate entity, and observing the usual rules in dealing with an infectious disease we have successfully eradicated and maintained herds free from this infection.

The position in regard to the other infections associated with mastitis is quite different and I am at a loss to understand the true significance of the presence of the organisms concerned. Frequently herd tests have shown positive for *Streptococcus uberis* or staphylococci in numbers of cows, negative at the next test and then positive again. The vast majority show no clinical abnormality at any time, while, in contrast, some cows have shown negative culture and within a few days have developed an acute clinical mastitis.

As far as North Cheshire is concerned, I would disagree with Dr. Stableforth as to the relative incidence of *Streptococcus agalactiae* infection. I note that he refers to a 15 per cent. incidence in all cows in both Cheshire and Southern counties surveys, whereas we have found the incidence in herds known to have a *Streptococcus agalactiae* mastitis problem has averaged only 20 per cent. While appreciating that it is difficult to compare overall incidence with that as shown by cases of clinical mastitis encountered, I would refer to the figures given by G. H. Arthur in a paper presented to this Association in 1946, and those recorded by myself at the same time. The former were obtained from observations on four herds over a five-year period and the latter from all cases attended in practice over a two-year period.

	Four herds. Five Years.		*All herds. Two Years*	
Corynebacterium pyogenes	22%		22%	
Group C Streptococci	20%	} 43%	24%	} 43%
Other Streptococci	11%		14%	
Staphylococci	12%		5%	
Negative cultures	14%		13%	
Streptococcus agalactiae	21%		22%	

It will be noted that, in both records, for every *one* case of clinical *Streptococcus agalactiae* mastitis encountered there were approximately *two* cases of mastitis associated with Group C streptococci, other streptococci (including *S. uberis*) or staphylococci. I find it difficult to reconcile these findings with Dr. Stableforth's figures referring to a Surrey survey in which "*Streptococcus agalactiae* was therefore responsible for about twice as much abnormality as all the others put together." This discrepancy in findings might be explained by the assumption that there are more bacteriologically positive udders for *Streptococcus agalactiae* relative to the cases showing symptoms than in other infections, but I have not found this so, as for instance in herds which have shown a high incidence of positive quarters for *Streptococcus uberis* with only an occasional clinical disturbance associated with this organism. Dr. Stableforth suggests that the over-all drop in incidence might be due to penicillin therapy in recent years, but I would point out that the above records were made at a time when oral sulphanilamide was the vogue.

With regard to the various approaches to eradication with penicillin reported by Dr. Stableforth, the five-day treatment is somewhat lengthy and in a herd of 30 cows where 120 doses of 100,000 units would be used daily, the cost would probably be in the nature of £30 to £40. In practice we find that most owners will pay this willingly for successful eradication, but the situation is somewhat altered if our eradication scheme just fails and re-infection takes place, or there is a substitution of mastitis associated with other organisms. In one herd in particular, having eradicated *Streptococcus agalactiae* infection much chronic mastitis associated with *Streptococcus uberis* was experienced, which to the owner had

all the clinical manifestations of the primary infection. Furthermore, after eradication it is essential to impress on an owner the necessity of isolating, testing, or treating any new addition to the herd.

Since penicillin has become freely and economically available, I have unfortunately not had any suitable herds presented and therefore I have no experience of eradication using this material alone. My experience of eradication with diamino-diphenyl sulphone alone or in combination with penicillin has been satisfactory and apart from the laboratory work the cost involved has not been excessive. Infusion of dry quarters affected with *Streptococcus agalactiae* with combined sulphone and penicillin has proved remarkably effective and of the first 39 quarters treated (showing all degrees of clinical abnormality) 37 were bacteriologically negative after one infusion only and the other two after a second treatment.

I would therefore suggest that an alternative approach would be to treat all lactating cows with procaine penicillin and all dry cows with sulphone and penicillin. Following a post-treatment herd test any resistant cases, dry or lactating, could be treated with the combined drugs. This would have the added advantage of reducing other infections to a greater degree.

In practice we have found that, when a full eradication scheme is not suitable, great benefit has been obtained by infusing all cows which have shown any clinical symptoms of mastitis during lactation when they go dry. In one herd this was carried out using sulphone alone and a subsequent herd test proved that *Streptococcus agalactiae* had become completely eradicated.

I believe it is essential not to attempt an eradication scheme on the strength of samples taken from the first one or two clinical cases but to carry out a complete herd test. Otherwise one may find that one is attempting to eradicate mastitis largely associated with other organisms.

If I may venture on ground somewhat more delicate, while appreciating that Dr. Stableforth cannot be responsible for headlines in the agricultural press, I would make a plea that stress should be laid on the fact that these encouraging results of mastitis treatment and eradication apply for the time being to *Streptococcus agalactiae* infection only. The practitioner is often sorely tried in explaining the true significance of press announcements.

To deal briefly with mastitis associated with other organisms, I feel we must keep asking ourselves what the presence of these pathogens in the secretion really means rather than what chemotherapeutic agent can be found to kill them. Why, for instance, are they easily demonstrable in one herd where there is no clinical mastitis, whereas another herd, in which all reasonable precautions are taken in hygiene and milking technique, is always in trouble? In spite of endless milk sampling of cases of clinical mastitis in the past I find now that if anything I am even more uncertain in diagnosing with what organism I am probably dealing. It is for this reason that it would appear to be the most sensible procedure in treating sporadic mastitis cases to "employ two strings to one's bow" by using a combination of penicillin and sulphone.

I have found no evidence that infusion with the sulpha drugs or penicillin had any protective effect against the onset of destruction associated with *Corynebacterium pyogenes*. Infusion of the dry cow during the summer danger period with penicillin or sulphone will, however, both cure a number of chronic streptococcal infections and at the same time decrease the number of acute reactions associated with organisms such as Group C streptococci. I would repeat again that resolution of these latter disturbances following for instance sulphapyridine or penicillin therapy has been the main cause of the erroneous reports of cures of "August-bag."

Mr Wright thanked Dr. Stableforth for his paper and for the excellent work done by him and his colleagues. He had not been able to take as many samples as he should have done; most of his cases were sporadic and cleared up after treatment. He was glad to know that facilities for cultural examination of large numbers of herds would be available. He was convinced that the symptoms of the various types of mastitis varied in different parts of the country and world (cf. Murnane, Australia) and found the first symptoms in his area were usually acute. There had been a great advance in treatment with the advent of the sulpha-drugs and penicillin. Could Dr. Stableforth give any more information *re* Nisin? He had not done a great deal of eradication work because much of his mastitis was sporadic; moreover, herds were flying and so new infection was continually being brought in. He had had good results from treating clinically affected cows, especially in the subsequent dry period and in many herds made a practice of infusing all cows which had shown trouble during the previous lactation, and had had excellent results. Personally, he was doubtful if under average farm conditions we could safely claim that *Str. agalactiae* could be eradicated. Dr. Stableforth's results, recently published, showed that in the nine herds in which observations were continuous for two years, a total of 51 cases occurred in 304 cows.

He thought that in very acute cases with gross changes in the udder it was best to treat first with sulphanilamide and toxoids and then with penicillin. He was glad to hear doses of 20,000 and 50,000 gave good results. He was convinced that hygiene was one of the most important factors in control and eradication. Causes of mastitis included bad hand-milking, bad use of machines, bad stripping. There was a marked absence of mastitis on small hill farms, where the cows were quietly hand milked by the wife, even when in filthy conditions.

The name "summer mastitis" should be kept to that caused by *C. pyogenes*. He agreed there were other and often mixed infections. Penicillin, Udolac and toxoids were of no use for treatment or prevention; in fact in his opinion penicillin was contra-indicated in the true *C. pyogenes* infection—it needed frequent stripping. Many of the cures attributed to penicillin were of infection other than *C. pyogenes*. Sulpha-drugs and penicillin might save lives. He was still of the opinion that the fly played an important part in transmission, and that the teat was the first place to become affected, *i.e.*, infection came from outside.

Staphylococcus mastitis had been prevalent and was one of the worst and most resistant forms, especially on some farms. Penicillin and sulpha-drugs were useful, and Udolac in cases of breakdown. What were the symptoms of *Str. zooepidemicus*? Dr. Stableforth had asked for information *re* treatment of teat sores. He had found gentian violet in phenol useful. In conclusion, he thought it was dangerous even to hint to farmers that any kind of mastitis could be completely eradicated by penicillin: reinfection probably would occur. Hygiene was essential.

General Discussion

Mr. Francis asked whether there was any difference in the bacteriostatic or bactericidal powers of the milk of cows which were resistant or susceptible respectively to *Str. agalactiae*. He believed a survey of clinical cases of mastitis had been made at Weybridge early in the war; what were the results? He put forward the advantages of the examination of incubated milk samples containing dye and sodium azide as a method of diagnosis which he had used with success and considered had many advantages over the treatment of all cows on the slightest provocation. He also thought the question of disinfection measures was important.

Mr. Tuckey also referred to methods of control and disinfection.

Prof. Wright asked whether any breed differences had been found as regards susceptibility. A second point was whether incidence was different in hand- and machine-milked herds. He also sought more information on the value of spraying cows with disinfectant in view of the known difficulties of disinfection of skin: did it really get rid of *Str. agalactiae*?

Mr. Kelly referred to some of his observations on staphylococcus infections in the udder. They were often of the same phage types as in humans and might be related to the health of the workers. Infection in cows was highest in late winter and early spring. He asked how many of the 18 cows described by Lancaster and Stuart at Weybridge had had an infection before their transmission experiments were begun and what was the volume of culture injected in the second lot of experiments reported by those workers. He had found that the best vehicle for injection of material into the udder was distilled water and the worst was saline. With regard to future studies, he considered attention should now be focussed more on hygiene and less on therapy. With good hygiene they had found that 30 per cent. of a group of cows recovered within two years. More information was also needed on methods of sterilisation, *e.g.*, they had found that on the handles of milk churns *Str. agalactiae* was killed within 30 minutes in flowing steam, but not in 20 minutes. With regard to the widespread distribution of infection in the environment of an infected cow, he wondered why infection did not spread faster than it usually did.

The Reply

Dr. STABLEFORTH referred first to the figures given for the various kinds of mastitis by Mr. Berger for his own observations and those of Mr. Arthur. It was clear that *Str. agalactiae* was of relatively less importance in that area than in the Surrey area and many others, whereas *C. pyogenes* and group C streptococci (presumably *Str. dysgalactiae* and *Str. zooepidemicus*) were high. Their figures, he understood, referred to clinical cases and could therefore be compared with the figures requested by Mr. Francis, which had been collected at Weybridge in 1942-43 by asking practitioners situated in various parts of England and Wales to send in samples from successive *clinical* cases to which they were called in a given week. The survey was so arranged that samples were drawn from Devon, Denbigh, and Essex one week, Hampshire, Northumberland and Warwickshire the next, and so on, for a year. The results showed about 45 per cent. due to *Str. agalactiae*, 15 per cent. to other streptococci, and 17 per cent. to haemolytic staphylococci, whilst 9 per cent. had *C. pyogenes* and the remainder other organisms or in some cases no organisms regarded as pathogenic. These figures were based on 1,324 cases; in 808 of which only one organism was present, in the remainder of which one organism was predominant.

The question of the cost of treatment was of course important, but it represented very little milk at present prices and, as Mr. Berger said, if eradication of *Str. agalactiae* and control of the practical problem was achieved, all was well. The possibility of re-infection of a free herd was something which had to be guarded against with all diseases. The fact that cases of mastitis might still occur, due to other infections, was something of which they always warned the owner, although in Surrey it was not often a problem. The question whether eradication of *Str. agalactiae* led to an increase in other forms of mastitis was a matter which they had considered carefully, because if it did happen it would be serious. In their work at Weybridge they had kept detailed card records of each cow in the herds from which *Str. agalactiae* was being or had been eradicated. These records covered one to two years in 60 herds and longer in some. Rises and falls in the incidence of these other infections occurred and a rise might last for weeks or months and there might be one or more clinical cases; but the general level of these infections was lower than before herd treatment. Others had reported increases,, but it was not their experience. He was glad Mr. Berger had stressed the value of a herd milk test before treatment because it was not possible to diagnose the kind of organism present on clinical findings alone.

Mr. Wright had said that many of his *Str. agalactiae* cases were acute in onset as described by, *e.g.*, Murnane in Australia. This was something which they had not seen in their hand transmission experiments and, even when large doses were injected into a quarter through the teat canal, there was rarely much heat or pain or marked swelling, though changes in the milk were often pronounced. The new drug "Nisin" had given encouraging results, including those with staphylococcus infections, but was not yet available for large scale trial. *Str. agalactiae* was not ubiquitous, but only found in places contaminated by infected milk.

Mr. Wright had raised a point regarding the total of 51 cases in 304 cows in two years reported in their recent paper on eradication. There was some misunderstanding over this statement. These 51 cases included all those in which the slightest abnormality of udder or milk had been seen and in a large proportion the sample sent to the laboratory at the time was normal and the cows' yield was unaffected; few were severe and, as stated, function was lost in only three of the quarters. This was surely a good enough result and the position after herd treatment was in all cases, except one, very different from that before. He was glad Mr. Wright had also raised the matter of hygiene and good milking practices. Both were of great importance and in these days of chemotherapy were, he thought, sometimes overlooked. It had also to be remembered that a cow which had been cured of an infection was just as susceptible as before. He could not agree that the term "summer mastitis" should be limited to *C. pyogenes* infection because so many of the cases which occurred in the summer—in heifers and dry cows—showed mixed infections. He agreed, however, that many of the cures probably occurred in these other infections. *Str. zooepidemicus* was the actively haemolytic group C streptococcus characteristic of wounds in horses, but which occurred in all species; hence its name. It usually caused an acute and serious mastitis with heat, pain and marked change in the milk and udder, but some cases were chronic. All were serious, but responded fairly well to penicillin. He could not agree with Mr. Wright's view that it was dangerous to say that *Str. agalactiae* mastitis could be eradicated. There was now ample evidence in this country and in others that it could be eradicated and remained absent unless reintroduced. Mr. Wright's emphasis on hygiene was however timely.

In answer to Mr. Francis, Mr. Lancaster had tried hard and long to find any difference which might exist between the bacteriostatic or bactericidal properties of resistant and susceptible cows, but could find none. Mr. Francis said that he (the speaker) treated whole herds at the slightest provocation. On the contrary, they first carried out a herd test and then decided whether mass herd treatment or treatment of infected cows only was desirable according to the results. With a heavily infected herd it was well worth while.

In answer to Prof. Wright, breed differences did not appear to be of importance. They had not really enough hand-milked herds to answer his question on this matter, but eradication of *Str. agalactiae* had not been more difficult in machine-milked herds, especially if no stripping was done. Sporadic attacks of mastitis did occur, however, and seemed to be often associated with machine-milking: further work was being done on this question. With regard to the analogy with the difficulties of disinfecting human skin, he thought the difference was that the difficulty of sterilising human skin was due to the fact that the flora concerned, such as haemolytic staphylococci, were resident flora, whereas, in most cases at any rate, *Str. agalactiae* was on the hair or surface of the skin. In any case, there was no doubt that it could be found easily before spraying and not afterwards.

Mr. Kelly's observation on staphylococcus infections had been interesting. In answer to his question regarding Mr. Lancaster and Mr. Stuart's transmission experiments, five cows of theirs had been previously infected (with a serological type different from that used in the experiments) and all had become reinfected early in the experiments, *i.e.*, they were highly susceptible. In the second group of experiments, secretion, not culture, had been used in a 1 ml. volume, the vehicle being the milk of the quarter which was going to be injected. He (Dr. Stableforth) had found, years ago, that this was the vehicle least likely to cause any irritation; his results with distilled water and saline supported Mr. Kelly's. With regard to his last question, the reason infection did not occur more frequently from an infected environment was, he thought, connected with dose and certain physical factors as well as the fact that it had to reach the teat canal. It was noticeable that their best hand-transmission results had been obtained with thick heavily infected secretion.

CENTRAL LIBRARY FOR ANIMAL DISEASES

BY

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LIBRARIAN

Nearly 100 years ago a few dozen books, likely to be of interest and use to the veterinary profession, were gathered together at Red Lion Square. This was to be a nucleus which, it was hoped, would expand by gift and purchase into a collection which could in its own right be called a library. Excellent and valuable as this intention was, the earlier stages of its fulfilment were very slow in spite of the generosity of a few donors among whom George Fleming will always be remembered. The books remained gathering the dust in the old museum and were used only in a somewhat haphazard fashion for three-quarters of a century.

In 1926, however, the collection entered upon a more constructive phase. The Reading Room was reorganised and refurnished and a lending service not only began but began to be used. From an almost moribund condition the library then increased steadily in strength for 13 years, not only accumulating in the process a useful stock of books, but, perhaps more important, now enabling its users to consult periodicals, pamphlets and reports which would keep them abreast of research.

During the early part of the war the library still contrived to keep open but damage by fire and the difficulties caused by evacuation forced it to close in 1941. It remained officially "closed" for five years. That is to say the reading room was not available and only easily accessible material could be sent out on loan. There was still, however, the work of keeping continuity in journals and reports.

The four years since the reopening have brought a number of changes. The library itself has been reorganised and the staff there increased. War damage repairs, having at last reached that level of priority thought suitable for libraries, have now been completed. The reading room, which is a pleasant room overlooking Red Lion Square, has been made a much pleasanter place to work in by a new system of heating and greatly improved lighting.

Anyone who is on a register of the College or is introduced by a member or by another library may use the reading room, borrow books or periodicals, and will find the library open from 10 a.m. to 5 p.m. every weekday except on Saturdays, when it is closed at noon.

The service it can offer is more extensive than is generally understood. Besides the books and journals which it is able to supply from its own shelves, it can, by working in conjunction with other libraries elsewhere, or through co-operative schemes, draw upon a very wide field indeed. Recently it has borrowed books for members not only from other British libraries but from France, Holland and Switzerland, and obtained photostats from the U.S.A. Perhaps most particularly it is indebted to the great medical libraries of London for co-operation.

It is, moreover, a service not confined to those who can call at Red Lion Square. Books and journals are sent by post anywhere in the United Kingdom. Unfortunately it is not able to extend this service overseas owing to the delays in transit. It will, however, have photostats made at cost and can sometimes waive the overseas lending rule in special circumstances.

With the extension of the library's scope the range of current periodicals has been improved—both by purchase and by additions to the number secured through that highly valued medium, the exchange service of *The Veterinary Record*—in the attempt to secure at least one from every country where veterinary journals are published. At present 130 are taken or received regularly and the librarian hopes that this number will increase. Already it is felt, however, that with this extensive improvement of sources of information, to which are added the reports received from Colonial and Dominion Veterinary Departments and Research Institutes in all parts of the world, there are few developments upon which the library is not equipped to supply the latest knowledge.

The new catalogue which is being compiled is not yet ready for printing. In the meantime the library does its best to keep members informed of its latest acquisitions through a quarterly list in *The Veterinary Record*. It also hopes to have a register of films of professional interest available shortly.

In drawing the attention of the profession to the facilities which it can offer, the library would make the modest boast that it believes itself to hold already the best collection of literature, historical and modern, upon veterinary and allied subjects in England, and it fully intends that the matter shall soon be put beyond all question.

Weekly Wisdom

"*. . . It is a great mistake to suppose that nations are not led by sentiment. It takes too poor a view of man's mission here on earth to suppose that he is not capable of rising, to his material detriment, far above his day to day surroundings. The dominant forces in human history have come from the perception of great truths and the faithful pursuance of great causes. . . .*"—Mr. Churchill, House of Commons Debate, March 28th, 1950.

CLINICAL COMMUNICATIONS

DEATHS IN YOUNG DUCKLINGS ASSOCIATED WITH INFESTATIONS OF THE NASAL CAVITY WITH LEECHES

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History

Losses were experienced among young ducklings which had access to a large millpond. The fowl population consisted of two swans, three adult khaki Campbell ducks, eleven Muscovy ducks and three sittings of ducklings (two Muscovy broods, totalling 26, and one khaki Campbell brood of 14). There were also numerous dabchicks and occasionally wild duck would alight on the pond.

The ducks were fed in runs and housed in wooden sheds at night, but after feeding were allowed free access to the pond.

The pond measured about 150 yards long and 100 yards wide, narrowing to 30 yards. Only small patches of bank were accessible owing to the presence of shrubbery. The average depth at the bank was 2 to 3 feet, and this had not varied to any extent during the drought, since the pond was fed from a stream leading from several other ponds, and was held to a mill race level.

The exact dates of hatching of the ducklings were not known, but from available evidence it seems probable that two broods were hatched in June and one in August. From the age of about one week, ducklings had periodically been missed and the carcases were never found. On September 8th, however, two ducklings were found dead in the water near the bank and a third was very weak, but alive, and survived only 24 hours. These three carcases were submitted for *post-mortem* examination. There were by now only 16 survivors out of the 40 ducklings.

Post-mortem Examination

The three carcases presented no obvious lesions and showed no signs of anaemia. Routine bacteriological examination of liver, small intestine, bone marrow and heart blood, on blood agar, McConkey, desoxycholate citrate agar and in serum broth, were uniformly negative. No coccidia or intestinal worms were demonstrated. Our attention was drawn by the keeper to the nasal cavities where we found a number of small leeches: on the most recently dead duckling ten leeches were found and on each of the others, three leeches. They varied in length from 3 to 14 millimetres and the chief site of attachment was the posterior third of the nasal turbinates and the region of the ethmoid. The leeches were identified as *Protoclepsis tessellata* by the Department of Zoology.

Further Examination

We made a further visit a month later when a duck and eleven ducklings aged about eight weeks were examined.

This brood had been kept off the pond since the previous visit, being confined to their run. Two days previously, however, they had been moved to a freshly prepared run at another site near the pond and had escaped, during the move, on to the pond for about an hour. The next day, two of the ducklings were found to be infested with leeches and during the visit three more were found to be similarly infested. Thus, with an hour's exposure on the pond, five out of eleven had acquired leeches. Of 20 adults examined at this visit, four were found to be infested. We recovered an adult leech from one and leeches were visible in the nostrils of others.

The Occurrence and Distribution of the Leech

A specimen of *P. tessellata* was found on the board which the ducks use for climbing out of the water. This specimen is illustrated in Fig. 1. Several smaller specimens were found clinging to submerged sticks and stones around the edge of the pond. Three other species of leech occur in the pond, but there is no evidence that these had attacked the ducks.

A fully grown specimen of *P. tessellata* is about 2 or 3 centimetres long when extended, and may be distinguished from other British fresh water leeches by the possession of our pairs of eyes close to the mid line of the head. These are just visible with a hand lens.

Fig. 1.—*Protoclepsis tessellata.* Dorsal view of a large specimen, partly contracted. In this position it measured 2·5 cm. in length.

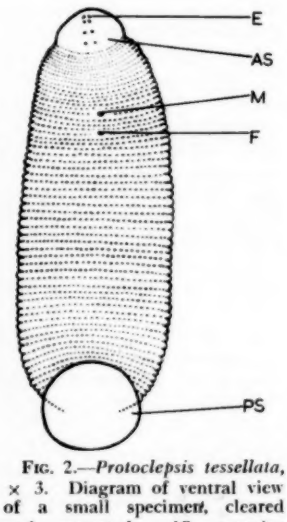

Fig. 2.—*Protoclepsis tessellata,* × 3. Diagram of ventral view of a small specimen, cleared and mounted. *AS,* anterior sucker; *E,* eye, on dorsal surface of head, seen by transparency; *F,* female generative aperture; *M,* male generative aperture; *PS,* posterior sucker.

P. tessellata was first described by O. F. Müller in 1774, and is known to be widespread in Europe; it also occurs in Chili and Japan. Records of birds being infested by this leech are listed by Harding (1910) and Christiansen (1939). Blanchard (1893) describes two examples of *P. tessellata* taken from the nasal cavities of the duck *Anas glacialis.* Weltner (1887) states that at a farm near Strasbourg the ducks and geese were all destroyed by leeches, described as *Glossiphonia* (*Protoclepsis*) *tessellata,* which were attached to the walls of the oesophagus. Büchli (1924) describes how a number of infested ducks were lame and some died: one was found to have five *Protoclepsis* in the nostrils, and the brain and its membranes had congested blood vessels. Christiansen (1939) gives details of heavy infestations of the eyes and nostrils of geese. Brown (1935) mentions that he received a record of a small specimen of *Protoclepsis tessellata* in the nasal cavity of a curlew from Loch Rhynd, Braco, Perthshire.

In the above cases, the identification of the leech is reasonably certain. In other recorded examples of an association between leeches and ducks, the leeches cannot be identified definitely as *P. tessellata.* They include several instances among birds in the Berlin Zoo, as well as records of leeches obtained from the breast plumage of a widgeon and a teal.

We have two unpublished records which have been communicated to us privately, of leeches occurring in the nostrils of birds. Miss P. M. Jenkin informed us that all the Mallard duck examined by one of her students in 1947, near Bristol, had *P. tessellata* in the nasal cavity, and Mr. Peter Scott gave details of a South American steamer duck, at Slimbridge, Glos, from the nostrils of which leeches were recovered and which subsequently died.

The distribution of *P. tessellata* in the fresh waters of Great Britain is not fully known. Harding (1910) describes it as "of rare occurrence in the British Islands." Existing records relate to Surrey, the Lake District, Renfrewshire, Cambridgeshire, Yorkshire and West Wales. In addition we have received the following unpublished records: The Bristol area (P. M. Jenkin), North Wales (E. G. Spaul), Surrey, Kent and Suffolk (J. H. P. Sankey), Yorkshire (P. F. Holmes), Devon (L. A. Harvey), Perthshire (A. R. Waterson), Edinburgh and Inverness-shire (N. Cleat).

Including the case which forms the first part of this article we have found *P. tessellata* in three localities in Berkshire.

Life History of the Leech

The existing knowledge of the life history of the leech has also been summarised by Christiansen (1939). *P. tessellata* is hermaphrodite and lays eggs which are enclosed in cocoons, which are attached to submerged stones or parts of plants. The mother covers the cocoons with her body and after about ten days the young leeches emerge and attach themselves to her ventral surface. Here they remain for about two or three months. After this, they leave the mother and further development depends on their obtaining a meal of blood. They attach themselves to vegetation near the surface of the water and from here may be picked up on the beak of a water bird. They then enter the nose or throat and suck blood from the mucous membrane. Once filled, they drop off into the water and a period of rapid growth ensues. For the leech to grow to sexual maturity, it is thought that three such blood meals and growth periods are necessary. These may follow in quick succession, or the leech may remain without a blood meal for as long as nine months, while waiting to be picked up by a fresh host.

According to Brown (1935) *Protoclepsis* is very common in Cheshire and during May and June is usually found in pairs, or singly, brooding over batches of eggs. In July, 1931, he found five large specimens carrying young. This would indicate that eggs are laid in May or June and the young are carried during July and possibly August. That being so, it

would appear that the young leeches seek their first blood meal in July, August or September.

Discussion

It would appear that *Protoclepsis* is fairly widespread in this country and at first sight it would seem surprising that its association with ducklings has not been recorded more frequently. The probable explanation is that small numbers of leeches in the nostrils of adult ducks do not distress the birds, but that a heavy infection of leeches in a very young duckling does cause sickness or even death.

It is probable that young leeches in this country do not leave their mothers and seek a host much before July or August. By this time a brood of ducklings hatched in, say April, will be three months old and may be strong enough to bear the presence of leeches in the nostril. In the case which we observed, however, the ducklings were hatched much later, probably June or August, and were exposed to the attacks of leeches from a very early age. The combined factors of late hatching and the presence of the leeches in large numbers, may, therefore, have resulted in deaths of the ducklings.

Conclusions

The cause of death in the ducklings examined has not been definitely established. There was no evidence of external injury and pathological, bacteriological and parasitological examination yielded no significant results. In view of the fact that in the past, the presence of *P. tessellata* has been associated with death in ducks on more than one occasion, we submit that the leeches were in fact the cause of death.

In considering the possible mode of action, we could find no evidence of anaemia, which might have been brought about by the leeches sucking blood. There remains the possibility that the leeches had some toxic action on the metabolism of the ducklings.

Acknowledgments.—Thanks are due to Professor C. H. O'Donoghue for his interest in the case and to Professor T. Dalling for helpful criticism.

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DISLOCATED HIP IN THE COW

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Subject.—A roan shorthorn cow, aged five and a half years.

History.—On August 14th, 1949, this cow was observed to be in oestrus and, after being ridden by another cow, was seen to have injured her right hind leg.

Symptoms.—The animal was standing and when made to move took very little weight on the right hind leg which was held stiff, slightly forwards and was rotated outwards. The greater trochanter was more prominent than on the opposite side and the distance between it and the external angle of the ilium was less than the normal.

The cow was deeply narcotised with 2 oz. chloral hydrate administered intravenously and a further examination was made with the animal lying on her left side. Movement of the limb revealed stiffness in the hip joint together with the typical crepitation of a dislocated hip, whilst rectal examination showed no fracture of the pelvis nor could the head of the femur be felt. On these findings a luxation of the right hip joint was diagnosed, the dislocation being in a dorso-anterior direction.

Treatment.—A rope was attached to the affected leg just above the fetlock and the limb was fully extended by two men. The leg was simultaneously rotated outwards by appropriate pressure at the point of the hock and at the stifle; at the same time a fourth person pressed the greater trochanter downwards and backwards. The dislocation was reduced with ease by these manipulations, a few seconds only being required before the head of the femur slipped back into place. The animal was propped up on her brisket and re-examined three hours later, at which time she was sitting comfortably. The following morning she walked with only slight stiffness, and thereafter made an uneventful recovery. There has been no abnormality in her gait nor any recurrence of the condition.

Comment.—This case is reported because, in our experience, dislocation of the hip in the bovine animal is not a common occurrence, and also because of the ease with which the dislocation was reduced under chloral hydrate narcosis.

DANGEROUS DRUGS ACTS: NEW REGULATIONS

The Dangerous Drugs Regulations, 1950 (S.I. 1950, No. 380), made on March 20th, 1950, were laid before Parliament on March 21st, and came into operation on April 1st.

The amendments made by Regulation 1 are consequential on the passing of the Veterinary Surgeons Act, 1948, and the full text of this Regulation is as follows:—

1.—(1) In paragraph (2) of Regulation 3 of the Dangerous Drugs Regulations, 1937 (hereinafter called "the principal Regulations"), after the words "registered veterinary surgeon," in both places where those words occur in sub-paragraph (*a*) (which provides that a person to whom a drug is lawfully supplied by a registered veterinary surgeon who dispenses his own medicines or on a prescription given by a registered veterinary surgeon shall be deemed to be a person authorised to be in possession of the drug so supplied) there shall be inserted the words "or person registered in the Supplementary Veterinary Register in pursuance of the Veterinary Surgeons Act, 1948."

(2) In paragraph (2) of Regulation 7 of the principal Regulations (which provides that where a person whose authority is withdrawn under the Regulation is a registered veterinary surgeon the Secretary of State may direct that it shall not be lawful for that person to give prescriptions for the purposes of the Regulations) after the words "registered veterinary surgeon" there shall be inserted the words "or a person registered in the Supplementary Veterinary Register in pursuance of the Veterinary Surgeons Act, 1948."

Regulation 2 consolidates the existing provisions as to the classes of persons authorised to possess and supply drugs, and amends them in relation to hospitals. The opening paragraphs of this Regulation are:—

2.—For Regulation 5 of the principal Regulations as amended by the Dangerous Drugs Regulations, 1948 (which authorises certain classes of persons to be in possession of, and to supply, drugs or preparations to a specified extent and subject to certain safeguards), there shall be substituted the following Regulation:—

"5.—(1) Persons who are members of the following classes, that is to say:—

(a) duly qualified medical practitioners;

(b) registered dentists;

(c) registered veterinary surgeons and persons registered in the Supplementary Veterinary Register in pursuance of the Veterinary Surgeons Act, 1948 . . . (d)—(j) (specifying other classes of persons) are hereby authorised, so far as may be necessary for the practice or exercise of their respective professions, functions or employments, in their capacity as members of their respective classes, to be in possession of, and to supply, drugs or preparations."

Certain qualifying provisions affecting authorisation follow, but these do not affect persons under classification 5 (1) (c).

ABSTRACTS

[Continuous Phenothiazine Therapy for Horses: Part II.—Haematological Studies with a Note on *Post-mortem* Findings. HANSEN, M. F., TODD, A. C., & KELLEY, G. W. (1949.) *Vet. Med.* **44.** 461–464.]

The toxicity for horses of continuous phenothiazine therapy was investigated. Reports are quoted which indicate that the toxic effects of phenothiazine in horses are those of a haemolytic anaemia and subsequent jaundice, to which individuals with a high percentage of the smaller erythrocytes (microcytes), such as the Thoroughbred, are more susceptible.

Twelve horses, including six Thoroughbreds, were used in this investigation, and divided into four groups of three animals. The horses in each group received a daily dose of 0·5, 1, 2 or 4 grammes of phenothiazine respectively. Two Thoroughbreds were included in each group except that receiving the 4 grammes dose, which consisted of "grade" animals only. Monthly blood samples were taken from one horse in each group (two Thoroughbreds included), for a period of 14 months. Red and white cell counts, haemoglobin concentrations, and the packed cell volume were determined in each case.

The results showed no significant difference between the four horses. There was a general trend towards a decline in the red cell count and haemoglobin content until the fourth month, followed by a gradual return to pre-treatment levels, with the haemoglobin content exceeding these figures. However, this decline and recovery could be correlated with a change of diet.

The mean corpuscular haemoglobin concentrations and cell volumes were constant throughout the experiment. No intracellular bodies were noted. *Post-mortem* examination revealed no lesions. Faecal examination showed a reduction in the numbers of strongyle eggs.

The authors conclude that no apparent detrimental effects followed the use of continuous low level phenothiazine administration for 14 months.

D. W. J.

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[Panting in Cattle. MINETT, F. C. (1949.) *Ind. Vet. J.* **26.** 174–182.]

The author draws attention to the prevalence of this condition in India and to the frequency with which it follows an attack of foot-and-mouth disease. The condition has also been encountered in some European countries as well as South America. European cross-bred cattle are mainly affected (8·4 per cent. of cases), whilst indigenous animals are less susceptible (2·4 per cent.). Cases occur chiefly among adult cattle, especially high yielding milch cows; dry cows and animals under one year are affected only occasionally. The attacks, which take place mainly during the heat of the day, especially when the humidity is high, are characterised by marked dyspnoea, panting, salivation, a high temperature, anaemia and poor bodily condition. Other symptoms emphasised are thirst, a desire to seek shade or lie in water and the growth of a long rough coat. Death supervenes only rarely. There is no permanent natural recovery and removal of the affected animals to the cool of the hills appears to be the only satisfactory method of treatment. As a preventive measure, back-crossing with indigenous stock is recommended.

It is suggested that the condition arises from a permanent physical defect of the heat-regulating mechanism due to defective functioning of the pituitary-thyroid-adrenal endocrine glands, consequent upon the existence of the foot-and-mouth virus. Enquiries made by the author revealed that in

(Concluded at foot of next column)

REPORT

[The Antibodies in Foot-and-Mouth Disease. J. B. BROOKSBY (A.R.C. Report Series No. 9, 1949.) Published by H.M. Stationery Office, price 3s. 6d. Pp. 87 + vii. (62 refs.)]

This report is divided into two parts. In the first, "The Measurement of Antibody," the author begins with a discussion of the various methods available for the estimation of antibodies to foot-and-mouth disease virus, with particular reference to the respective merits of neutralisation and protection tests. The neutralisation test in cattle, using homologous virus and antiserum, has advantages over the guinea-pig protection test, in which bovine serum is tested against a strain of virus which must be adapted to the test animal. The latter test, however, is of value when economy of animals must be considered, and was used by the author in the study of antibody fractionation procedures.

A standard technique for the guinea-pig protection test is described, in which the serum is inoculated subcutaneously into the flank, followed 30 to 60 minutes later by the intracutaneous injection of 1,000 to 10,000 M.I.D. of virus into the plantar pad of one foot. By the use of a "lesion score" method, in which secondary lesions are given arbitrary scores according to severity, the results can be treated according to the method of Reed and Muench to give the 50 per cent. protective end-point of a serum. At least four animals should be used for each test, the conditions of which must be carefully standardised.

The bovine neutralisation test is then discussed; virus and antibody are mixed *in vitro*, and the amount of inactivation of virus determined. The necessary accuracy in the estimation of virus titres is secured by using the method of multiple inoculation of the bovine tongue described by Henderson. The observations are sufficiently numerous to allow calculation of the 50 per cent. positive end-point. It is possible to perform the neutralisation test either by testing ascending dilutions of virus against a constant serum dilution, or ascending dilutions of serum against a fixed amount of virus. An experimental comparison of the two methods was made, on the basis of which it is concluded that both methods are satisfactory within certain limits, but that the method using varying serum dilutions and a fixed dose of virus is more useful for the bulk of the work described in this report.

A series of experiments on the quantitative relationship between virus and serum is described, using the bovine neutralisation test. It is shown that this relationship can be expressed graphically in the form of a sigmoid curve when the log. serum dilution used is plotted against the percentage of inoculated sites on the bovine tongue failing to react with a lesion, *i.e.*, showing neutralisation of virus by serum. It is further shown that when a partially neutralised virus-serum mixture is diluted out, some dissociation of the union occurs, and reactivation of antigen can be demonstrated, as occurs with some other viruses.

Factors affecting the accuracy of the bovine neutralisation test are temperature, *p*H, time of contact, and the mixing and sampling of reagents. It is important to use fresh virus, as this requires less serum for neutralisation than does virus which has been stored for some time; the explanation of this phenomenon is not apparent. In addition, the error in

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the United States a condition closely simulating "panting" occurs in cattle due to a vitamin A deficiency, but it is not suggested that the latter plays any part in the etiology of the condition.

J. C. G.

titrating the virus used must be considered in estimating the dose of virus neutralised. Experimental evidence is adduced to show that by increasing the number of animals used in any one test from two to four, the experimental error due to variations in susceptibility can be reduced by almost one-half. The author's impression is that the bovine test is more reliable than that performed in guinea-pigs. Further advantages are the wide range of antibody titres which can be studied, small volumes of serum required (2 ml. or less), the use of homologous virus and antiserum, and the rapidity with which results are obtained (24 hours).

An experiment is quoted in which the protective power of serum in bovines was measured. This involved inoculating three groups (each of eight steers) with 150 ml., 50 ml. and 17 ml. per cwt. respectively of a bovine convalescent serum. A fourth group was inoculated with 19 ml. per cwt. of an alcohol fraction of the same serum. Each animal was then placed in close contact with an infected steer for 14 days. The groups receiving 150 ml. serum per cwt. and 19 ml. alcohol fraction per cwt. were completely protected, whereas all the animals receiving only 17 ml. serum per cwt. became infected. Two out of eight cattle receiving 50 ml. per cwt. (a usual clinical dose) became infected. The titre of the alcohol fraction was further shown by neutralisation test to be eight times that of the parent serum, which corresponded with the fact that it had been concentrated eight times by volume.

Some applications of the bovine neutralisation test are described, *viz.*, the demonstration of antibody in the sera of vaccinated cattle, the study of " hyperimmune " sera and the estimation of antibody in the sera of animals long recovered from the disease. Experimental details are given, and the results discussed. A point of practical interest is that the titre of a " hyperimmune " serum was not significantly different from that of ordinary convalescent serum.

The first section of the paper concludes with an examination of the complement fixation test for the measurement of antibody. The author was not successful in using this test with bovine sera or concentrated antibody solutions, but considers that it could probably be used for the detection of antibody in guinea-pig serum.

Part 2 of the report, " The Occurrence of the Antibody in the Serum Fractions, and the Partial Purification and Concentration of the Antibody," opens with a brief account of the work done with antibodies to other viruses. Results obtained by other workers indicate that there is no constancy of distribution of antibody in various serum fractions as between different viruses, and even that the antibody to a particular virus may be associated with several fractions.

Experiments dealing with the ammonium sulphate fractionation of various convalescent sera are described, from which it is concluded that the majority of antibody is associated with the euglobulin, although the distribution as between euglobulin and pseudoglobulin varies from serum to serum. The ratio of activity of euglobulin to pseudoglobulin is of the order of 3 : 1, but there is evidence that the ratio varies according to time of convalescence. Observations on the electrophoretic analysis of sera showed that similar variations could be demonstrated, but that the gamma globulin generally showed high activity.

Experimental data on the alcohol fractionation of sera are provided, on the basis of which the author has worked out a simple method for the preparation of concentrated antibody solutions which are six- to eight-fold more potent than convalescent serum. The concentrate is shown to contain 21 per cent. of the original serum protein, and almost all the antibody of the parent serum. The alcohol precipitation

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technique can also be used, in combination with the bovine neutralisation test, as an aid to the demonstration of a low level of antibody in the sera of vaccinated cattle. An experiment on these lines is described.

The main advances emerging from this study are :—

(1) The introduction of a new method of assessing the results of guinea-pig protection tests.

(2) The development of the neutralisation test in bovines.

(3) Further information concerning the virus-antibody relationship and the distribution of antibody in serum fractions has been obtained.

(4) The value of alcohol-fractionation as an aid to the estimation of sera with low antibody levels has been demonstrated.

[This paper is a valuable addition to the literature on foot-and-mouth disease, and should be consulted in the original by those interested in the subject and in immunology generally.]

L. H. C.

QUESTIONS AND ANSWERS

The submission of questions for inclusion in this column will be welcomed ; they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

" Staggers " and Anaphylaxis

Q. 348.—*I have noticed a marked tendency for the incidence of " staggers " to reach a peak about ten days after " turning out." This incidence is also associated with grazing on " re-seeded " pastures.*

1. *What supporting evidence, if any, is there for this observation ?*

2. *If such evidence exists, then it can reasonably be held to support the theory of anaphylaxis and it follows that it should be possible to prepare a parenteral desensitising preparation in co-operation with seed specialists and a manufacturing biological firm.*

A.—There appears to be plenty of clinical evidence of the incidence of " staggers " in cattle a few days after turning out on re-seeded and other pastures. This condition is generally recognised to be hypomagnesaemia, also called " Hereford disease " and grass tetany.

Whilst we know that the actual cause of the condition is hypomagnesaemia, it is also generally believed that there is some trigger mechanism which actually induces the syndrome which is met in the field. The nature of this trigger mechanism is not well understood, but there seems to be no evidence in the literature that it could be associated with anaphylaxis. In the type which is met with a few days after animals are turned out to grass, Muir at one time suggested the hypothesis that the sudden increase in the protein intake encouraged rapid deposition of blood salts in the bone to make up for the heavy depletions which have developed during the winter months, this rapid deposition being faster than the intake, or at any rate faster than the metabolism of the animal could replace them in the blood. Other factors which may set off the syndrome may be a hypocalcaemia or some psychological disturbance such as oestrus.

Treatment of this condition is usually urgent, as death may occur very shortly after the onset of symptoms. The exhibition of about 2 oz. of magnesium sulphate parenterally generally results in rapid recovery. It may be given subcutaneously or intramuscularly, or, in the hyperacute case, intravenously. In the latter case it must be injected with care,

and usually 1 oz., injected slowly, overcomes acute symptoms, and the remainder is then given subcutaneously.

The tendency for "bloat" or "tympanites" to occur in cattle freshly turned out on leys with a high clover content, on lucerne, etc., is well known.

The part played by allergy in some cases of "bloat" has been reported upon from time to time in veterinary publications. There are very obvious theoretical and practical difficulties in preparing a parenteral desensitising preparation which could be applied in veterinary practice. The value of adrenalin, calcium and anti-histamines has been mentioned from time to time in the veterinary Press. The correspondent is referred to the Proceedings of the Grassland Conference and to articles in *The Veterinary Record* by Lamont & Gould. One, however, recognises "staggers" in such a condition only when associated with approaching asphyxia, due to pressure on the diaphragm.

References

Barker, J. R. (1948.) Proceedings N.V.M.A. Grassland Conference, 86–89.

Green, H. H. (1948.) *Ibid.* 63.

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Thickening of the Dewlap in the Cow

Q. 349.—*What treatment do you recommend for chronic thickening of the dewlap in a dairy cow? I have in mind a very valuable pedigree Shorthorn cow which the owner hopes to enter for the next Dairy Show. This fibrosis of the dewlap is of over 12 months' standing. It is imperative for show purposes that this thickening should be removed completely.*

A.—Thickening of the dewlap in the dairy cow is a comparatively common condition and almost invariably is due to trauma, where the animal in feeding or lying down, continually bruises the dewlap against the edge of the manger. When first noticed the condition is usually of an oedematous nature and will subside spontaneously when the cause is removed—in other words, if the cow be kept in a loose box with a good deep soft bed. If, however, the cause remains, the swelling gradually becomes organised and a chronic fibrosis occurs. The condition is very much more difficult to treat at this stage and it is doubtful whether a complete cure is possible in a case of over 12 months' standing.

The first essential is the proper management of the cow. It must be kept well bedded in a loose box or out at pasture. Daily massage with iodine ointment or painting with tincture of iodine or even a mild blistering might assist but resorption is bound to be slow.

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Operation for Making Dogs Mute

Q. 350.—*I have been approached by a dog breeder who wishes to have two adult corgi dogs made mute.*

Could you please let me have some information regarding the technique of this operation and could you also let me know how the law stands with regard to an operation of this nature?

A.—In reply to the question regarding the muting of dogs, the following are the details of the operation as carried out by the respondent.

Prognosis.—Good.

Anaesthesia.—Intravenous nembutal.

Instruments.—Scalpel, forceps, curved scissors, retractor with ratchet, and lips to avoid damage to cartilage.

Site and Procedure.—Shave and cleanse in usual manner the whole of the larynx area. The incision into the anterior part of the larynx must be dead central, care being taken to avoid the transverse branch of the jugular. The cords are easily visible and may be picked up and completely excised.

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MEMOIR

PROFESSOR FOLMER NIELSEN

With the sudden and lamented passing of Professor Folmer Nielsen, the N.V.M.A. has lost the first honorary member and the one who probably did more than anyone else to stimulate interest in the subject of bovine infertility and to focus attention upon the importance of the recognition of early pregnancy.

Those who heard his exposition at the Aberdeen and Dublin Congresses of the Association in 1924 and 1926, and who witnessed his demonstrations could not have failed to be impressed by his ability and his knowledge. Folmer Nielsen made many friends on those two visits and it seemed difficult to appreciate that a quarter of a century had passed when he came again last year—full of vigour as ever, his sense of humour unimpaired and looking as youthful as he confessed he felt.

In the intervening years, a number of graduates from this country have visited Denmark and had cause to be grateful to Folmer Nielsen for his hospitality and his ever ready help. Both of us who pay this tribute to our friend owe to his inspiration, teaching and example our own primary interest and early proficiency in manipulating the genitalia of the female bovine.

It was Folmer Nielsen who indirectly was largely responsible for the benefit which accrued to the veterinary profession and through it to agriculture and the nation during the war years and since. This is, we believe, no idle tribute for, in the changing type of bovine infertility, the increasing importance of the early recognition of pregnancy or non-pregnancy has become manifest.

There are, we fear, few veterinarians in this country who could emulate Folmer Nielsen's feat at the 'International' last year when, having read his paper in English, he corrected both the German and French interpreters and finally remounted the rostrum to give a fluent summary of his paper in both these languages.

The Association has been peculiarly fortunate in its overseas guests and many will mourn the premature death of Folmer Nielsen. He lived a full life in every sense of the word and enjoyed living, good company and hard work, and in this he never spared himself or others.

Typical of the man were his last conscious words, spoken to his charming and devoted wife whose indulgence we ask for quoting them: "I don't want to die. I have plenty of work to do and I love you and the children."

We gratefully salute a very human gentleman, a good friend and a great master; and we extend our heartfelt sympathy to his family and his colleagues in Denmark.

H. W. Steele-Bodger.
S. L. Hignett.

The wound is closed by interrupted sutures in the skin only. Post-operative treatment is negligible; there may be slight cough for a few days.

If the cords are only cut barking recurs in six to eight weeks; complete excision gives good results. The patients continue to attempt to bark and appear quite undismayed by the lack of sound.

W. Riser, in America, does the operation through the mouth with special non-crushing forceps to retract the epiglottis and long-handled forceps and scissors to cut the cords.

Legal Aspect.—The operation is permissible and is often the alternative to euthanasia.

QUESTIONS IN PARLIAMENT

Feedingstuffs

Mr. York (March 27th) asked the Minister of Food if he will give a table showing the total, in tons, of animal feedingstuffs available to the agricultural industry during 1949; and an estimate of the total likely to be available in 1950, under the following headings: wheat, wheatenings and offals, barley, oats, maize, oil cakes and meals, other imported feedingstuffs and other home-grown feedingstuffs, stating, where appropriate, the amounts imported.

Mr. Webb: For the calendar year 1949 the quantities of rationed animal feedingstuffs distributed in the United Kingdom were, in thousand long tons:—

Rationed Feedingstuffs	Imported	Home grown or home produced	Total
Wheat (unmillable) ...	29	20	49
Wheat offals	115	779*	894
Barley	467	422	889
Oats	117	142	259
Maize	755	—	755
Oilcakes and meals ...	398	656	1,054
Other feedingstuffs ...	318	280	598
Total	2,199	2,299	4,498

*The proportion of home-grown wheat to the total quantity of wheat used in millers' grists was 30 per cent. in 1949.

These figures are directly comparable with and subject to the same qualifications as those for the years 1945-48 which were given to the hon. Member on April 26th, 1949. It is too early to say how much of each kind of feedingstuffs is likely to be available in 1950, but it is hoped that the total of imported and home produced supplies together will be about 6 million tons.

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Flour (Extraction Rate)

On March 27th, Mr. Awbery, Brigadier Rayner, Mr. De la Bere and Mr. Black all put questions to the Minister of Food, requesting him to consider reducing the extraction rate of flour from wheat in order to increase the whiteness of the flour and to help provide the extra animal feedingstuffs needed by farmers, pig clubs and smallholders.

Mr. Webb: Of course, I should like everybody to have the sort of bread they prefer; but in this matter of the extraction rate we have to consider whether we can buy the extra wheat, whether it will cost dollars, whether the extra milling offals would be dearer than other imported feedingstuffs, and so on. My Department is watching all these changing factors very closely, and when the balance of advantage lies with lowering the extraction rate we shall do it. No ships are being used for storing grain at present.

Mr. Awbery: Is it not a fact that we are now spending dollars on the purchase of provender for cattle and that we should save the expenditure of those dollars if we reduced the extraction of the wheat?

Mr. Webb: All these, of course, are matters to balance in the country's interests, and as I have promised, when the appropriate time comes we shall be able to consider this particular matter.

Brigadier Rayner: Would the right hon. Gentleman consider, with a fresh mind, whether this continued limitation on food for pigs and hens is really necessary; and whether a little thought and a little courage, and particularly a return to a little more power for the private buyer in the world market, would make it unnecessary?

Mr. Webb: I have tried to give thought to it. Courage is another matter. It is a matter to be carefully considered, and I am quite satisfied, after consultation with the Minister of Agriculture, that he, on his side, is quite happy about it.

Mr. Somerville Hastings: Will my right hon. Friend keep carefully in mind the nutritional value of foods, as well as their colour and palatability?

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Poisonous Insecticides

Brigadier Medlicott (March 23rd) asked the Secretary of State for the Home Department whether he is satisfied that the requirements of the Poisons Act are being complied with in regard to insecticides now in use, in relation to agricultural and horticultural produce.

Mr. Ede: I have no evidence that the Poisons Rules, which control the sale of poisonous insecticides, are not being observed.

Slaughtering Facilities, Newbury

Mr. Hurd (April 3rd) asked the Minister of Food if he is aware that slaughtering facilities at Newbury are inadequate to deal with the additional bacon pigs now being offered for slaughter there, owing to foot-and-mouth disease regulations; and if he will arrange for an additional slaughterhouse to be opened so that local farmers and smallholders can dispose of pigs before they become wastefully fat.

Mr. S. N. Evans: I know that the prolonged foot-and-mouth disease restrictions in the Newbury district have prevented the slaughter of pigs at the usual places outside the restricted area and have resulted in increased numbers having to be killed at Newbury slaughterhouse and at the Abingdon bacon factory. I am having enquiries made locally to see if there is any other slaughterhouse that could be brought into use immediately to handle pigs.

Mr. Hurd: Will not the Minister act promptly? These slaughterhouses are not being used, yet over the week-end I had no fewer than six telephone calls from farmers and smallholders who cannot get their pigs killed.

Mr. Evans: If the hon. Member will give me the addresses of the slaughterhouses I will go into it immediately.

NOTES AND NEWS

Diary of Events

April 18th.—Annual Meeting of the Southern Counties Division, N.V.M.A., at Bournemouth, 6 p.m.

Apr. 19th.—Meeting of the Association of Veterinary Teachers and Research Workers, at the Royal (Dick) Veterinary College, Edinburgh, 11 a.m.

Apr. 19th, 20th and 21st.—**Quarterly Meetings of Council and Committees, R.C.V.S.**

Apr. 21st.—Meeting of the Mid-West Division, N.V.M.A., at Bristol (Berkeley Café, Clifton), 2.15 p.m.

April 21st.—Special Meeting of the North Wales Division, N.V.M.A., at Ruthin (Council Chamber), 2 p.m.

Apr. 26th.—Meeting of the South-Eastern Division, N.V.M.A., at Ashford (County Hotel), 2.30 p.m.

April 27th.—Meeting of the Herts and Beds Division, N.V.M.A., at St. Albans (70, Holywell Hill), 7.30 p.m.

Apr. 28th.—Meeting of the Yorkshire Division, N.V.M.A., at Leeds (Hotel Metropole), 2.30 p.m.

May 6th.—Annual Meeting of the Association of Veterinary Officers, at the Royal Veterinary College, N.W.1, 2 p.m. Annual Dinner, 6 p.m.

N.V.M.A. Council and Committees

The next Council and Committee Meetings of the Association will be held at the Royal (Dick) Veterinary College, Edinburgh, on April 26th, 27th and 28th.

The time-table is as follows:—

Wednesday, April 26th.
11 *a.m.* Veterinary State Medicine Committee.
2.30 *p.m.* Organising Committee.

Thursday, April 27th.
10 *a.m.* Home Appointments Committee.
11.30 *a.m.* Parliamentary and Public Relations Committee.
2 *p.m.* General Purposes and Finance Committee.

Friday, April 28th
11 *a.m.* Council Meeting.

R.C.V.S. Examinations

May 4th.—R.C.V.S. Animal Management Examinations commence at Dublin.
May 9th.—R.C.V.S. Entries for D.V.S.M. Examinations due.
May 15th.—R.C.V.S. Pharmacology, etc., Examination (Revised Syllabus): Written Examination.
May 17th.—R.C.V.S. Pharmacology, etc., Examination (Revised Syllabus): Orals and Practicals (London and Dublin).
June 8th.—R.C.V.S. D.V.S.M. Written Examination commences, at Edinburgh.
June 22nd.—R.C.V.S. Membership Written Examination.

Cambridge School of Veterinary Medicine

The Institute of Animal Pathology has now been incorporated within the University as the Department of Animal Pathology. The Institute as such has ceased to exist and the premises and lay personnel have been taken over by the new Department. The following appointments to the scientific staff of the Department have been announced:

University Lecturer (Veterinary Parasitology). G. Lapage, M.A., M.D., CH.B., M.SC.

University Lecturer (Veterinary Chemical Pathology). R. Scarisbrick, PH.D., M.R.C.V.S., A.R.I.C.

Assistant Director of Research. R. R. A. Coombs, PH.D., B.SC., M.R.C.V.S.

Appointments previously announced in connection with veterinary education were:

R. S. Comline, PH.D., B.SC., B.A., M.R.C.V.S., University Lecturer in the Department of Physiology.

R. A. Green, B.SC., M.R.C.V.S., University Demonstrator in the Department of Zoology.

At present there is a pilot group of eight students taking the first year of the veterinary course, which extends over six years. A slightly larger number may be admitted next October but it will be necessary to limit strictly the numbers until plans for the teaching in the clinical years are more advanced.

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The Offices and Library of the Royal College of Veterinary Surgeons

The entrance to the offices of the Royal College of Veterinary Surgeons and the Central Library for Animal Diseases is now on the *ground* floor of *No. 9*, Red Lion Square, and no longer on the first floor.

The hours at which business can be transacted in both the offices and the library are 10 a.m. to 5 p.m. on week-days, except Saturday, when the hours are 10 a.m. till 12 noon.

Owing to shortages of staff, it is asked that visits and telephone calls will not be made on Saturdays if it can be avoided.

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PERSONAL

B.O.C.M. Appointments:—Dr. Wm. Mackay, M.R.C.V.S., who has been actively associated with animal nutrition in this country and abroad for the past 20 years, is shortly to join the Spillers Advisory Organisation. After a period on the staff of the Royal Dick Veterinary College, Edinburgh, Dr. MacKay was attached to the Colonial Service in Kenya. He was also at one time associated with Lord Boyd-Orr at the Rowett Institute where he worked on the effect of nutrition on tuberculosis. Following some time as Veterinary Officer with the Ministry of Agriculture he joined the staff of the Iodine Educational Bureau in London where he has since been engaged in investigating diseases of poultry in this country, Scandinavia and the Near East.

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Mr. A. Leslie Walther, M.A., M.R.C.V.S., is joining the staff of the B.O.C.M. as general assistant to Dr. W. P. Blount. Mr. Walther took his agricultural degree at Cambridge, and qualified as a veterinary surgeon in 1936. After a period in general practice in Sussex he joined the Ministry's staff, and was one of their first inspectors to investigate poultry problems in the field. During the past three years he has been farming in Devonshire.

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Birth.—Thomson.—At Westbay Nursing Home, Broughty Ferry, on April 2nd, 1950, to Netta (*née* Scott), wife of William Thomson, M.R.C.V.S., Dundee, a son.

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Forthcoming Marriage.—Cradock—Green.—The engagement is announced between Geoffrey John Godfrey Cradock, M.R.C.V.S., of Hamstone House, Caterham, Surrey, and Mary Kimbell Green, M.R.C.V.S., daughter of Mr. and Mrs. A. W. Green, 290, East Park Road, Leicester.

Marriage.—Macdonald-Mullett—Sheffield.—On March 31st, 1950, at St. Bartholomew's Church, Quorn, Henry, son of Mrs. Mullett, of Loughborough, to Monica, daughter of Mr. W. L. Sheffield, M.R.C.V.S., and Mrs. Sheffield, of Quorn.

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Parliamentary and Scientific Committee.—Dr. W. R. Wooldridge, M.SC., M.R.C.V.S., has been reappointed one of the Hon. Secretaries of the Parliamentary and Scientific Committee, of which body he has been a Vice-President for a number of years.

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R.C.V.S. OBITUARY

Wadley, Edward John, C.B.E., D.S.O., Lieut.-Colonel R.A.V.C. (retd.), Caerlon, Parklands, Johannesburg, Transvaal, S. Africa. Graduated London, January 5th, 1901. Died April 1st, 1950; aged 70 years. Colonel Wadley served with the Royal Army Veterinary Corps in the South African war and the first world war, in which he won the D.S.O. He retired in 1921.

The Late Edward Shepherd, B.V.SC., M.R.C.V.S.

The death, announced in our last issue, of so promising a member of the profession as Mr. Edward Shepherd at the age of 25 years, will have evoked widespread regret among our readers.

Mr. Shepherd was the second son of Mr. T. C. Shepherd, a well-known farmer, and Mrs. Shepherd, and a grandson of the late Mr. Robert Shepherd, of Parkside, and of Mr. J. W. Bate, veterinary surgeon of Sutton Weaver. Having qualified at Liverpool in 1947, he had been practising at Lymm for two years and married in 1948 Miss Alicia Allman, elder daughter of Mr. and Mrs. L. Allman, Frodsham. He was a member of the Frodsham Young Farmers' Club and of the Runcorn Young Conservatives.

Mr. Shepherd was cremated at Landican, Birkenhead, following a service at Frodsham Parish Church at which the Rev. J. A. Davies, vicar of Aston Church, officiated. The following members of the profession attended: Messrs. H. Sumner, R. Sumner, J. Holmes, K. Whalley, P. Curtis, E. Greenway, E. D. Greenway, White, and R. Roberts.

A Tribute

P. E. C. writes:—

"The death of Edward Shepherd at the age of 25 years robs the profession of a hard-working and well-loved practitioner. His tireless efforts for his clients may have subscribed to his early death but at least he achieved one of the ambitions of his life when he had a practice of his own. Handicapped with ill health as he was for many years, his success was a great tribute to his character. Deepest sympathy will be extended to his young wife in her great loss."

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LONDON VAN HORSE PARADE

The stormy weather of Easter Monday restricted largely to enthusiasts the spectators of the 36th parade of the London Van Horse Parade Society in Regents Park, but in compensation all—and despite the conditions they numbered many thousands—secured an unhampered view. There were 372 horses in this year's parade, an increase of 20 on last year. Dairies again provided the largest number of entries with 92, greengrocers being second with 65; laundries, bakers and carriers were well represented and the brewers were responsible for some smart turn outs. The prize giving was at the hands of Mrs. James Paterson, who officiated gracefully in the lamented absence, through an accident, of the President, Lady Frances Daresbury.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Swine Fever:

Surrey.—Frosbury Farm, Gravett's Lane, Worplesdon, Guildford (Mar. 31st).

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"*Breeding for Improvement.*"—On the invitation of B.O.C.M., Professor L. M. Winters, of Minnesota University, visited this country recently and gave a number of lectures on "Breeding for Improvement," the lectures being illustrated by colour films. B.O.C.M. has now collected the addresses and discussions and has published them in a 56-page booklet under the title "Breeding for Improvement." This booklet is obtainable from B.O.C.M. (Ltd.), 19, Blythswood Square, Glasgow, C.2.

ASSOCIATION OF VETERINARY STUDENTS

Annual Conference and Sports Tournament

The eighth annual conference of the Association was held at Glasgow from March 24th to 27th (inclusive) and for the second time was held conjointly with a sports tournament.

With the President, Mr. L. N. Owen, in the chair, the conference was officially opened by Mr. W. L. Weipers, M.R.C.V.S., Director of Studies, Glasgow University Veterinary School, who welcomed the delegates and observers from the seven veterinary schools which were represented.

The following papers were presented:—

1. "The Teaching of Veterinary Science as a Preventive Science rather than a Curative Medicine," by G. Carrol (Dublin), the discussion being opened by Professor A. Robertson, M.A., M.R.C.V.S., of the Royal (Dick) Veterinary College.

2. "Films and Veterinary Education," by B. Cunningham (Liverpool), with Mr. Alex. Thompson, M.R.C.V.S., Glasgow, as the opener of the discussion.

3. "The Number of Graduates Entering the Profession," by J. Crooks (London). The opener of the discussion was Mr. Donald McAllister, M.R.C.V.S., D.V.S.M., Stranraer.

An inter-School debate between Liverpool and Glasgow was held on the motion that "This meeting is in favour of State Control of Veterinary Practice," with Mr. A. Ford, M.R.C.V.S., Linlithgow, in the chair. After a lively and entertaining discussion the motion was defeated.

All day Friday there was an exhibition of veterinary instruments and human appliances open to view in the College. This was organised by the Glasgow branch of U.F.A.W. On the Friday evening a scientific film show was held, featuring "Nagana," "Foot-and-Mouth Disease," "Nutrition of Ruminating Animals," in technicolor, from the Onderstepoort laboratories in the Union of South Africa; also "Hobday's Roaring Operation" from the Royal Veterinary College, London.

The G.U.V.M.A. dance was held in the College on Saturday evening. On the Sunday there was a bus tour, held in glorious weather, which included Loch Lomond and a stop at Inverary for tea. By kind permission of the Governors, 30 students visited the Hannah Dairy Institute at Ayr on the Monday afternoon. These last three items were provided free of charge, due to the generosity of the Glasgow students.

Sport

Knock-out Competition for N.V.M.A. Rugby Football Trophy

1st round: Liverpool 17—Glasgow 3.

2nd round: Royal (Dick) Veterinary College 27—Liverpool 3.

(An apology was received from London for their inability to send teams.)

Points Competition for R.C.V.S. Soccer Cup

Liverpool 1—Glasgow 3.

Liverpool 3—Edinburgh 3.

Edinburgh 1—Glasgow 0.

The table tennis tournament was won by Liverpool.

The presentation of the Cups was performed by Mr. W. Deas, M.R.C.V.S., of Lasswade, a former Scottish International, who also refereed the Rugby Final. The Rugby Cup went back to Edinburgh. Keen appreciation of the Royal College of Veterinary Surgeons' generosity in providing a Cup for Soccer was expressed, and this too went to Edinburgh. The G.U.V.M.A. Table Tennis trophy was presented to W. B. Cartmell, of Liverpool.

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The 1951 conference is to be held in Edinburgh and Mr. A. Whitelaw, of the Royal (Dick) Veterinary College, was elected President. A motion was passed to carry on with the formation of foreign student exchange schemes with all practicable speed.

The outstanding success of the conference was due chiefly to the financial assistance and hard work carried out by the Glasgow students and especially by R. Orr (former President). J. Doyle and H. Boyd. The co-operation of members of the profession was a notable contributory feature. The West Scotland N.V.M.A. sent £5 to the Conference Fund and Glasgow University Court £30.

A complete account of the conference will be found in the journal of the A.V.S., due to be published in June.

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LEGAL NOTES

Deaths of Pigs Following Administration of Worm Powder: Judgment for Veterinary Surgeons.—At Bromsgrove County Court, on March 18th, Judge Langman found in favour of defendants, with costs, in an action in which Horace Byng, smallholder, claimed £142 10s. from Messrs. Gold and Griffiths, veterinary surgeons, of Redditch, for alleged negligence in the supply of powders furnished as treatment for worms in pigs, it being alleged that three animals died and four were made seriously ill thereby. The main questions at issue were the nature of the telephone message plaintiff gave, the weight of the pigs having a vital bearing on the dose which could be administered with safety, and the type of powder supplied—whether, as it was suggested on the plaintiff's behalf, it was a mixture of phenothiazine and sodium fluoride, or sodium fluoride only, as defendants maintained.

Outlining Byng's case, Mr. D. R. Ellison mentioned that sodium fluoride was a white powder, and phenothiazine green. The powder supplied to plaintiff, he alleged, was greenish in colour.

In evidence, plaintiff asserted that in ordering "a worm drench" nothing was said about the weight of the pigs. Seven packets containing a mixture of green and white powder were delivered, "one packet to be given to each pig in light food with warm water." After the substance had been administered all the pigs vomited and within five minutes were showing signs of extreme pain. The three that died were each just over six score, the others being about seven score.

Cross-examined by Mr. Sunderland (appearing for the defendant firm), plaintiff admitted that in a letter to Mr. Gold on August 15th, he had stated that he had rung up to ask for medicines to remove worms from seven pigs "which average seven score downwards." That was, in fact, what he had said on the telephone.

The Judge: Do you mean that your previous answer was wrong?

Plaintiff: Yes.

Mr. Herbert J. Hiles, M.R.C.V.S., of Worcester, said that sodium fluoride was commonly used as a worm drench for swine; half-ounce doses would be suitable for pigs of between five and a half and six and a half score. Another substance sometimes used was phenothiazine, a greenish or bluish-grey powder. Great caution had to be used if it was administered to swine, especially in the case of young pigs. The symptoms described would be equally consistent with an overdose of sodium fluoride.

Mr. T. N. Gold, M.R.C.V.S., said that sodium fluoride was used as a worm powder for pigs only and phenothiazine was applied for a similar purpose solely for cattle and horses. For pigs weighing six score, half an ounce of sodium fluoride was the correct dose, but for pigs of less than four score that would be a "gross overdose" and might prove fatal. A few days after the death of the pigs he saw the four survivors; two of them would weigh about six score, one of the others about three and a half score and there was a smaller one still, of about two and a half score. Defendant added that he pointed out to plaintiff that he had asked for powders for six-score pigs and told him that the three that died must have been killed by the powders because they were below the weight he (Byng) had stated. He had never given phenothiazine to pigs. Sodium fluoride was the safest of worm treatments and created no danger if used in correct dosage.

Mr D. J. Anthony, M.R.C.V.S., veterinary surgeon for Messrs. Marsh & Baxter, supported this view, adding that he had never known a fatality as the result of the use of sodium fluoride. He knew of no purpose for which that drug and phenothiazine would be mixed together.

Mr. E. W. Whitney, M.R.C.V.S., an assistant veterinary surgeon with the defendant firm, asserted that the packets he delivered at Byng's house contained sodium fluoride—a white powder—only. Each of the three dead pigs was definitely below six score, and when one of them was weighed he read the weight at 3 stone 13 lb.—not 6 stone 4 lb. as plaintiff had stated in evidence.

In the course of his judgment, Judge Langman said he was satisfied that the medicine sent was sodium fluoride and that it was administered to the pigs in the proper way according to the directions given; also that the pigs died because of an excessive dose of that substance. He had come to the conclusion that the message given was that the drenches were wanted for six-score pigs; that accordingly defendants were entitled to make up drenches for pigs of that weight—and that is what he found they did. The defendants rightly relied on the order. He was afraid plaintiff was not quite careful enough in giving it. Dealing with an alternative complaint of "breach of warranty" under the Sale of Goods Act, the Judge said that, too, must fail. He could not find that the drugs were not reasonably fit for the purpose for which they were bought or that the mistake over the dose given was due to defendants.

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FOOT-AND-MOUTH DISEASE

Need for Care in Using Swill

In reply to a question in the House of Commons Mr. Tom Williams, Minister of Agriculture and Fisheries, said: "There is no doubt that contact with contaminated swill is the most common origin of outbreaks of foot-and-mouth disease in this country."

It cannot be too strongly emphasised (states the Ministry of Agriculture in a recent announcement) that the taking of unboiled swill on to farm premises involves a risk. Farmers are therefore

urged that whenever possible they should obtain their swill from a central sterilisation plant; such swill has been shown to be absolutely safe. If, however, unboiled swill is brought on to premises where farm animals are kept, every care should be taken not only to prevent the animals from having any direct access to the material but also to prevent the carriage of infection to the animals either on the clothes or boots of farm workers or by birds, rats and dogs.

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SOIL EROSION DANGERS IN THE COLONIAL DEPENDENCIES

In an address to the Royal Society of Arts in London, Sir Harold Tempany, agricultural adviser to the Secretary of State for the Colonies from 1940-46, spoke of the dangers of soil erosion in the Colonial dependencies, especially in the native areas and among small cultivators.

So far little more than the fringes of the problem had been touched. There was an obvious need for increased agricultural production in the Colonial dependencies, but if this was to be achieved the erosion problem must be overcome. He emphasised that this necessitated over-all planning and controlled land use. There had hitherto been understandable reluctance to impose restrictions, particularly on native lands, while treaty rights and similar considerations at times acted as barriers. But in time, perhaps not too far ahead, their absence might bring disaster. The need for them was increasingly recognised in many countries, including the United Kingdom, the United States, and many others; especially in the Colonial dependencies, where rapidly declining fertility and erosion losses from improper land use was so great a threat, the need for far-reaching powers to enable the requisite degree of control over land use to be exercised seemed inescapable.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

BRUCELLOSIS IN PIGS

Sir,—So far as we are aware brucellosis in pigs, caused by *Br. suis*, does not exist in this country. Our attention was drawn to a paper read by D. J. Anthony, M.R.C.V.S., D.V.S.M., at a meeting of the Welsh Branch N.V.M.A. (*Vet. Rec.* 1950. **62.** p. 41) in which the following statement occurs: "Extensive outbreaks of brucellosis are not reported in Britain, as they are in America and certain European countries. . . . Whilst some of the abortion symptoms described in America are also seen in British sows, the fact remains that tests of blood samples from sows in this country have shown little evidence of any widespread infection with *Brucella suis*."

We have corresponded with Mr. Anthony since the publication of the article and he tells us that he has no knowledge of any cases where *Br. suis* has been recovered from pigs in this country, although symptoms in herds of pigs are somewhat similar to those described in America, from which the organism has been recovered. It is important to confirm that our herds of pigs are still free of this infection.

The purpose of this letter, therefore, is to ask the co-operation of our veterinary colleagues in obtaining aborted foetuses from pig herds, so that we can carry out as many examinations as possible for the presence of *Br. suis* infection. For satisfactory results foetuses are necessary: definite reliance cannot be placed on the results of agglutination tests.

Yours faithfully,

Ministry of Agriculture and Fisheries, THOS. DALLING.
Veterinary Laboratory,
New Haw,
Weybridge, Surrey.

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SODIUM FLUORIDE IN THE PIG

Sir,—The introduction of sodium fluoride as an anthelmintic marked a distinct advance in the treatment of the pig for the removal of the large round worm. We have found the dosage scale of 1 per cent. of meal fed as worked out by American investigators and the 0·1-0·15 grammes per lb. weight as recommended by Australian workers satisfactory in practice.

A point that now seems to require emphasis is that these dosage scales were based on samples of sodium fluoride of 73 per cent. purity, *i.e.*, the ordinary commercial grade. Recently we have had a number of complaints of illness and death among pigs following treatment with sodium fluoride even when the above dosage rates were adhered to. A probable explanation would seem to be that samples of this drug now available have a purity of 95-98 per cent. It is essential, therefore, that when using sodium fluoride its percentage purity should be ascertained and if the purity differs much from the commercial figure of 73 per cent. then a corresponding alteration in the dosage rates should be made.

We have used these purer grades of sodium fluoride with the necessary adjustment in the dose and we have found them efficient and without any alarming evidence of toxicity.

Yours faithfully,
D. LUKE,

Veterinary Research Division, W. A. M. GORDON.
The Farm,
Stormont.
February 9th, 1950.*

* Letter delayed in post.—*Editor.*

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OVERSEAS MAIL

VACANCIES AND "THE PERIOD OF APPLICATION"

Sir,—*The Veterinary Record* of January 21st, 1950, contains a letter under the heading "R.C.V.S. Council Election," suggesting that voting papers should be sent to overseas members by air mail. In thanking Mr. Spicer for his representation and the R.C.V.S. for its prompt action, I may state that my voting paper was received three weeks (at least) before the *Record* quoted.

The generous attitude adopted by the R.C.V.S. referred to above prompts me to make a similar suggestion to the N.V.M.A. The *Record* takes up to six weeks to reach Australia, allowing for internal distribution, and frequently more than one edition appears to arrive by the same mail. During this period of transit, the time allowed to answer advertisements has usually expired. Would it not be possible to persuade Government Departments and other public bodies to allow members overseas to answer advertisements, by making the closing date for applications say ten weeks from the date of publication? The suggested period of ten weeks would, on Mr. Spicer's figures, allow a week for an intending applicant in, for example, New Zealand, to consider the matter and then to reply by air mail. It is appreciated that in some instances posts must be filled quickly, and also that advertisements may appear in the local lay press, but this should not affect the principle involved. Few members will disagree that the *Record* is the correct place in which to advertise and answer advertisements, if only for their own protection, and it is felt that this privilege should not be restricted to those members in or near the United Kingdom.

As an illustration of the short period frequently allowed, two examples, chosen at random, are quoted below:—

(a) The Veterinary Services Council, New Zealand, required applications for posts to be forwarded not later than December 5th, 1949, to a London address in response to an advertisement appearing on November 26th, 1949—nine days.

(b) The Corporation of London advertised a post on June 25th, 1949, and applications were required before July 11th, 1949—16 days.

Yours faithfully,

Randwick, JAMES P. WILSON.
New South Wales.
March 22nd, 1950.

[It has long been the policy and practice of the Association to endeavour to induce advertising bodies to allow sufficient time to elapse to enable applications to be received from members overseas.—EDITOR.]

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NO FOOT—NO HORSE

Sir,—A few evenings ago I was browsing through Wooldridge's Encyclopaedia, second edition, and on page 921 came across the following statement. "The old and often quoted dictum of Jeremiah Bridges, No foot—no horse, is as true to-day as at any former time."

Now as this remark is generally ascribed to John Jorrocks I at once turned to my copy of "Handley Cross" and there sure enough Jorrocks in one of his "sporting lectors" says, "The precept, No fut—no 'oss, is well to be borne in mind perhaps, as also No 'ock—no 'unter." So clearly Jorrocks was not the originator of the phrase.

I regret to say that I know nothing of Jeremiah Bridges, who obviously was a sound and practical observer as well as a personality. If one of your readers would be kind enough to give a short account of him, and his activities, it would be much appreciated.

Yours faithfully,

Sundale, G. K. SHAW.
Wilton Road,
Natal.
South Africa.
March 29th, 1950.